TACSM Abstract

The Comparison of High-Intensity Interval Exercise vs. Continuous Moderate-Intensity Exercise on C1q/TNF-Related Protein-9 Expression and Flow-Mediated Vasodilation in Obese Individuals

1,2 BRANDON G. FICO, 3 RYAN S. GARTEN, 1 MICHAEL C. ZOURDOS, 1 MICHAEL WHITEHURST, 1 PETER J. FERRANDI, 1 KATELYN M. DODGE, 1 GABRIEL PENAA, 1 ALEXANDRA A. RODRIGUEZ, and 1 CHUN-JUNG HUANG

1 Exercise Biochemistry Laboratory; Department of Exercise Science and Health Promotion; Florida Atlantic University, FL
2 Cardiovascular Aging Research Laboratory; Department of Kinesiology and Health Education; University of Texas at Austin, TX
3 Department of Kinesiology and Health Sciences; Virginia Commonwealth University, VA

Category: Masters

Advisor / Mentor: Huang, Chun-Jung (chunag5@fau.edu)

ABSTRACT

PURPOSE: A recent novel adipocytokine, C1q/TNF-related protein-9 (CTRP9), has been shown to increase activation of endothelial nitric oxide synthase and reduce vasoconstrictors (e.g., endothelin-1). In addition, CTRP9 may play a compensatory role in obesity-related endothelial dysfunction. Although there is limited information regarding exercise-mediated CTRP9, high-intensity interval exercise (HIIE) has been shown to be as or more effective than continuous moderate-intensity exercise (CME) in improving indicators of endothelial function (e.g., brachial artery flow-mediated dilation [BAFMD]). Therefore, the purpose of this study was to investigate the effect of acute HIIE vs. CME on serum CTRP9 and BAFMD responses in obese individuals. METHODS: Sixteen young male subjects (9 obese and 7 normal-weight) participated in a counterbalanced and caloric equated experiment: HIIE (30 minutes, 4 intervals of 4 minutes at 80-90% of VO2max with 3 minutes rest between intervals) and CME (38 minutes at 50-60% VO2max). Serum CTRP9 and BAFMD were measured prior to, immediately following exercise, and 1 hour and 2 hours into recovery. RESULTS: The concentration of serum CTRP9 was significantly increased immediately following acute HIIE and CME in both obese and normal-weight groups (p = 0.003). Furthermore, both significant treatment by time and group by time interactions for BAFMD were observed following both exercise protocols (p = 0.018; p = 0.009; respectively), with a greater CME-induced BAFMD response at 2 hours into recovery in obese compared to normal-weight subjects. Additionally, a positive correlation in percent change (baseline to peak value) between CTRP9 and BAFMD was found following acute CME (r = 0.589, p = 0.016). CONCLUSIONS: Acute HIIE is as effective as CME to upregulate CTRP9 expression in both obese and normal-weight individuals, although CTRP9 may potentially improve CME-mediated BAFMD. The novel results from this study provide a foundation for additional examination of the mechanisms of exercise-mediated CTRP9 on endothelial function.